Historically, horses have been selected for many traits (speed, agility, cow sense, color, prettiness, muscling, etc.), but fertility has seldom been on that list. As a result, the horse breeding world often has to deal with horses that are not necessarily the most fertile. In fact, many times breeders have to work with extremely subfertile individuals because of the great success those individuals have had in the show pen or on the racetrack. In addition, mare management has an enormous impact on pregnancy rates. Therefore, it is no surprise that horse breeding can be a very frustrating, time consuming and costly business. To maximize the efficiency of the breeding process, proper management of broodmares throughout the year is vital. The foremost consideration is determining the likelihood that a mare will conceive, carry a fetus to term, and deliver a viable foal. Although unforeseeable problems may still occur, there are a number of procedures that can help to make this determination. Collectively these procedures are referred to as a breeding soundness examination (gynecological exam) and entail an external and internal examination of the mare using palpation, speculum, ultrasonography, as well as a uterine culture and possibly biopsy.

Before focusing on the breeding soundness exam, however, there are several things that mare owners can do on their own well before the breeding season arrives to aid in maximizing their mare’s fertility. The simplest of which is to merely expose the mare to artificial light beginning around Thanksgiving. Research has shown that 16 hours of total light stimulation for a minimum of 10 weeks will jump-start the mare’s endocrine system so that she will begin cycling earlier. The extra hours of light stimulate the pineal gland located in the brain to decrease the production a hormone called melatonin. The decreased concentrations of melatonin remove the suppressive effect on the reproductive system resulting in increased production and release of the gonadotropin hormones, which are the primary hormones responsible for follicle production and ovulation.

When mares are kept in a stall, the easiest way to achieve 16 hours of perceived daylight is to leave the barn lights on from about 7 a.m. until approximately 11 p.m. In addition to the required total hours of light per day, the light intensity is critical. A general guideline to estimate sufficient brightness is that the light in the stall is adequate if you can easily read a newspaper in all areas of the stall. A 150-watt clear bulb in the middle of a 13 foot by 13 foot stall will usually suffice. It is important to make sure to eliminate shadows within the stall, as they can decrease the hormonal response of the mare.
Three important points to remember when planning to put a mare under lights are:

1) Artificial lighting must be started early. Thanksgiving is a good trigger date to remind mare owners to start. It takes a minimum of 8 weeks (with 10 weeks being more ideal) for a mare to respond. This means that if your mares are put under lights at Thanksgiving they should begin cycling normally by February 15.

2) Leaving the lights on twenty-four hours a day is not advised. There are some research data to suggest that continual light for an extended period of time may cause a mare’s reproductive system to shutdown.

3) The light intensity must be sufficient to signal the pineal gland to decrease melatonin production, so be sure to check the light brightness in each area that mares will be housed.

The second management practice that all mare owners should follow well in advance of the breeding season is maintenance of proper body condition of the mares. Broodmares that are too thin will often have longer and more erratic transitional periods causing a significant delay in the first fertile ovulation of the year. Therefore, mares should be in good body condition and well fed when they are started under the artificial lighting system. To be in good body condition, mares should not have any ribs visible. Furthermore, when the rib area is palpated the fat should feel somewhat spongy. Mares should have fat deposits around the tail head, as well as a crease down their back. Additionally, the withers should look slightly rounded and the shoulder and neck should blend smoothly into the body. It is important to palpate your mares to really feel what their body condition is, as it is difficult to visually appraise their condition when they have long winter hair.

Body condition is not only affected by the mare’s daily feed ration, but it is also influenced by her deworming program and dental care. Therefore, in addition to feeding high quality forages and grains in adequate amounts, be sure that your mares are on an appropriate deworming program and that their teeth are free of hooks, points, waves or any other abnormalities that could cause pain and/or a reduced ability to chew their feed sufficiently to optimize digestion.

In addition to insuring that your mare is in the appropriate body condition and using artificial lights to prompt earlier cycling, it is important to evaluate the reproductive tract health of your mare by having your veterinarian perform a breeding soundness examination (BSE). The purpose of a BSE is to detect
any reproductive abnormalities that may affect the mare’s ability to deliver a healthy foal. A BSE is particularly essential if a mare lost a foal at any stage of gestation the previous year or failed to conceive all together. Ideally, those mares should have been evaluated and treated as the problems actually occurred, allowing time for the abnormalities to be treated or corrected in a timely manner well before the initiation of the new breeding season. If your problem mare was not evaluated and treated in the fall, then she will need to have a thorough examination performed in the spring prior to her first breeding of the season. Also, if you are breeding a mare for the first time, it is advisable to have a routine breeding soundness examination performed by your veterinarian.

The first part of the BSE is a physical examination of both the external and internal reproductive anatomy of the mare. Inspection of the external genitalia of the mare allows the veterinarian to recognize any anatomical problems that could contribute to contamination of the uterus. An upright and well toned perineum (the area below the anus) is a major factor in the exclusion of air, feces, and other contaminants from the vagina and subsequently the uterus. The vulva is the mare’s first line of defense against infection reaching the uterus. Normal conformation of the vulva includes vertical alignment of the vulvar lips, in addition to the vulvar lips being full, firm and meeting evenly in the midline. As mares age, lose body condition, or deliver several foals, the perineal region may deteriorate. The vulva may become more sloped with the upper end tipping in toward the anus. This alignment makes it possible for small pieces of feces to collect on the lips of the vulva as it creates somewhat of a shelf under the anus. This increases the opportunity for fecal contamination in the vagina. Additionally, the vulvar lips may lose tone as a mare loses weight or ages, especially if she is foaling year after year. Furthermore, during the birthing process, injury to the vulva can occur which may affect its function in the future. Both loss of tone and injury to the vulva will hinder the natural seal that healthy, toned, properly conformed vulvar lips provide. When the vulvar seal is compromised, pneumovagina (wind sucking) can occur. That means the mare can aspirate air, bacteria and contaminated materials into her vagina, causing vaginal inflammation (vaginitis) which can lead to cervicitis (cervical inflammation) and inflammation of the endometrium or uterine lining (endometritis), resulting in subfertility. When a mare is in heat, the vulva relaxes, exacerbating the problems already present with a sloped or untoned perineum.
A Caslisk’s operation can be performed on mares with poor perineal conformation to decrease the risk of contamination and infection of their reproductive tract. This is also often called “stitching” or “sewing” a mare up. During this procedure the edges of the vulvar lips are “freshened” (the outer layer is cut away) and then sutured together from the anus down to the pelvic floor, leaving a sufficient opening for the mare to still urinate easily. Once the vulvar lips grow together the sutures can be removed. There will then be a complete physical barrier most of the length of the vulva to prevent contaminants from entering the vagina. During the physical examination of the external genitalia the veterinarian may recommend that a Caslisk’s be done at that time or once the mare has been confirmed in foal. It is important to note that to prevent traumatic tearing during delivery, the vulva must be reopened by performing an episiotomy one month prior to the mares expected foaling date. Additionally, if you are intending to breed a mare using live cover, the Caslisk’s must be removed to prevent the mare’s vulvar area from being injured during breeding.

Next, the veterinarian will examine the internal reproductive organs via palpation, ultrasonography, and the use of a speculum. When examining the vagina, the veterinarian will determine if it has the proper
slope. As the vagina extends toward the cervix, it should slope up slightly. This upward slope insures that urine will flow out of the vagina and be completely voided from the body. Some mares have an exaggerated downward slope of the vagina toward the cervix. As a result, those mares will be urine poolers. Urine pooling is the retention of incompletely voided urine in the vagina. Pneumovagina from improper vulvar conformation predisposes mares to urine pooling. Having puddles of urine in the vagina, near the cervix may lead to irritation and subsequent inflammation of both of those structures. Moreover, it increases the possibility of contaminants being introduced into the uterus during both natural cover breeding and artificial insemination. It is possible in some cases to surgically correct the anatomical defect that causes urine pooling.

The last line of defense to protect the uterus from the external environment is the cervix. The cervix is a strong, thick-walled sphincter that is a dynamic organ in that it changes shape, consistency, and size according to hormonal changes during the estrous cycle. During diestrus (the period of time when the mare is not receptive to the stallion) and pregnancy, increased concentrations of plasma progesterone cause the cervix to tighten down and essentially close, forming a physical barrier protecting the uterus from contamination. During estrus (heat) the cervix is typically relaxed, very open and swollen, allowing intrauterine ejaculation or insemination and drainage of uterine fluid.

Cervical inspection must be a part of the routine breeding soundness examination of the mare as cervical damage or abnormalities might exist. It is relatively common for an older maiden mare to have fibrosis resulting in an unusually tight cervix. As a result, the cervix fails to relax properly during estrus, inhibiting uterine fluid drainage, causing fluid build-up in the uterus. Impaired cervical drainage of uterine fluid can predispose a mare to persistent endometritis.

The cervix may be damaged during the foaling process. The chance of cervical damage during parturition is increased if there is dystocia (foaling difficulty) associated with delivery especially those that require a fetotomy (removal of dead foal in pieces). Damage to the cervix can also occur during overzealous mating by an over-sized stallion, especially if the mare is not in full heat. Damage caused to the cervix during these traumatic events may result in failure of the cervix to close during diestrus. This can lead to persistent endometritis, failure to conceive, or early embryonic death as the uterus is
continually exposed to the contaminants. Moreover, failure of the cervix to remain closed for the duration of pregnancy can lead to loss of the pregnancy.

The cervix can be assessed via palpation or through the use of a vaginal speculum allowing for visual evaluation of the structure. The visual inspection through the speculum is an important component of the reproductive exam. Changes in the color (increasing angry reddening) of the vaginal and cervical tissue or the evidence of inflammatory discharges are often telltale signs of inflammation and/or infection within the uterus. Additionally, it is often easier to visualize damage that has occurred to the cervix as compared to identifying damage via digital palpation.

Transrectal ultrasonography provides a non-invasive method of assessing the uterus for the presence of fluid. Excess uterine fluid appears as dark patches on the ultrasound screen within the walls of the brightly imaged uterus. More critical assessment of uterine abnormalities can be made (e.g. retention of fluid, endometrial cysts) by ultrasonography than by palpation alone. Also, subsequent evaluations of treatments for these problems can be more accurately assessed.

Uterine cysts can be successfully imaged using ultrasonography. The size, number and location of uterine cysts should be recorded prior to the breeding season for reference. Cysts may range from a few millimeters to several centimeters in diameter. The diagnosis of uterine cysts may or may not have significance for fertility; however, a uterine cyst can be easily misidentified as an early conceptus if it was not recognized prior to attempting pregnancy detection.

Once the physical examination of the mare’s anatomical structures has been completed the veterinarian should do a uterine culture to determine the presence of bacteria that may cause endometritis. A uterine culture, also commonly referred to as an endometrial swab or simply “a swab”, is a technique that must be performed with care. The culture swab is essentially a long Q-tip™ encased in a sterile plastic tube. The guarded swab is passed through the vagina and cervix, typically via a speculum, and into the uterus. Then the swab is pushed through the cap, the uterus is sampled by rubbing the Q-tip™ end of the swab on the uterine lining, and then the swab is withdrawn well back into the tube. During the sampling procedure, care must be taken to ensure that contamination of the sample (by touching the swab to vaginal or cervical tissue) does not occur. Contamination of the
sample could cause a false positive culture, leading to a mistaken diagnosis and subsequent inappropriate treatment of a normal uterus.

Results of the uterine culture must be interpreted with caution. The findings of the culture should be used in combination with the physical findings to draw conclusions about uterine health. Bacterial isolation from the uterine culture in conjunction with evidence of uterine discharge and/or uterine fluid imaged with ultrasonography should lead to a diagnosis of endometritis. However, no signs of inflammation and no discharge dispute the presence of some bacteria and does not necessarily indicate endometritis. Rather, it may just be some small amount of bacterial contamination within a normal uterus.

To further determine the health of the uterus, a sample of the uterine fluid can be obtained, either from the culture swab or by flushing the uterus with a small amount of sterile saline. A cytology evaluation is performed by staining the uterine fluid sample and viewing the stained sample under a microscope. Since neutrophils (white blood cells) migrate to the uterine when contamination and inflammation of the uterine lining occur, the presence of neutrophils in the sample is a more reliable indicator of endometritis than the mere presence of bacteria. In situations of low-grade inflammation, cytology can be a great value as they help the veterinarian make a more confident diagnosis when the physical examination is inconclusive, yet the culture results are positive for bacteria. In this scenario, if the cytology slide shows a presence of numerous neutrophils then it is concluded that the mare has endometritis. However, if there are few or no neutrophils found on the cytology slide that, coupled with no physical evidence of inflammation or discharge, the veterinarian would conclude that the uterus is normal with slight bacterial contamination.

The last procedure that may be done during a breeding soundness exam is a uterine biopsy. This is a more invasive technique that involves taking a sample of the uterine lining tissue to scrutinize under a microscope for the presence of scar tissue. A biopsy instrument is passed through the cervix into the uterus and a piece of uterine tissue is removed. Depending on the findings of the palpation exam one or two uterine tissue samples may be collected. When the samples are examined under a microscope, they are categorized according to the likelihood of the mare becoming pregnant and having a foal. There is a four-category classification system that is commonly used to help assign significance to the
biopsy results. Category I indicates a normal, health uterine lining suggesting that greater than seventy percent of mares with a Category I uterus will foal. Category IIA identifies mild endometrial changes projecting that fifty to seventy percent of those mares will foal. Category IIB indicates moderate changes within the endometrium suggesting that from twenty to fifty percent of the mares will foal. Finally a Category III biopsy contains severe endometrial changes and none of these mares are expected to foal. This information is useful to determine a mare’s anticipated success rate for conception and full-term maintenance of pregnancy. A mare with significant scar tissue in her uterus has a poor chance of getting in foal and staying pregnant.

Thorough evaluation of your mare’s reproductive health well in advance of scheduled breeding will help ensure that any problems are detected and corrected in time for breeding. A careful breeding soundness exam in conjunction with managing your mare’s body condition and using artificial lights to stimulate her to cycle earlier will allow you to maximize your chances of having a healthy, pregnant mare this spring.